

# Work Order ID 139982

Wednesday, December 16, 2015 9:09:33 AM

\*139982\*

U/R

Page 1

Item ID: D412-664-403  
Revision ID: URF 15-561  
Item Name: 412 Stainless Steel Aft Crosstubes - High

Accept

\*N9000040100\*

Setup Start \*NS1\*

Stop \*NS2\*

Start Date: 12/16/2015 Start Qty: 1.00 \*1\*

Required Date: 12/16/2015 Req'd Qty: 1.00 \*1\*

Cust Item ID:

Customer:

Reference:

Approvals: Process Plan: ML3

Date: DEC 16 2015 Tooling:

Date:

Run Start \*NR1\*

QC:

Date: SPC (Y/N):

Date:

Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description                                                            | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|-------------------------------------------------------------------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| Draw Nbr                       | Revision Nbr                                                                        |                      |         |        |              |               |               |                  |                |
| D412-664-443                   | A U/R <u>OK 12/16/17</u>                                                            |                      |         |        |              |               |               |                  |                |
| 100                            | Document Control                                                                    |                      |         |        |              |               |               |                  |                |
| *100*                          | DOCUMENT CONTROL                                                                    |                      |         |        |              |               |               |                  |                |
| DC                             | Memo                                                                                | 0.00                 |         |        |              |               |               |                  |                |
| Doc.Control -USB or Paperwork  | Photocopy bluefile & type labels per PPPD412-664-403                                |                      |         |        |              |               |               |                  |                |
|                                |                                                                                     |                      |         |        |              |               |               |                  |                |
| 110                            | BENDING MACHINE - CROSSTUBES                                                        | 0.00                 |         |        |              |               |               |                  |                |
| *110*                          |                                                                                     |                      |         |        |              |               |               |                  |                |
| CNC Bend 2                     | Memo                                                                                | 0.03                 |         |        |              |               |               |                  |                |
| CNC Alpha 160 Bender           | Bend tube as per Dwg D412-664-443 using CNC bender program _____ and Folio FT _____ |                      |         |        |              |               |               |                  |                |
|                                | ****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****                              |                      |         |        |              |               |               |                  |                |
| 127                            | QC15- Crosstube Dimensional Check                                                   | 0.00                 |         |        |              |               |               |                  |                |
| *127*                          |                                                                                     |                      |         |        |              |               |               |                  |                |
| QC                             | Memo                                                                                | 0.00                 |         |        |              |               |               |                  |                |
| Quality Control                | ***MARK CUT LINES***                                                                |                      |         |        |              |               |               |                  |                |

D412-664-403/139982

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

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| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                              |  |
| Date : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Step #: _____                                                                                                                                                                      | QTY Effective : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | MRB (QS1042) Approval                        |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | Completed By                                 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | Lead hand / Supervisor Approval Verification |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | QC / QA Coordinator Approval                 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                              |  |
| <b>Root Cause</b><br><div style="display: flex; justify-content: space-between;"> <div>           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div>           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |                                                                                                                                                                                    | <b>FAULT CATEGORY</b><br><div style="display: flex; justify-content: space-between;"> <div>           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div>           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div>           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Misabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div>           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |  |                                              |  |
| OTHER : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                              |  |

**Work Order ID 139982****\*139982\***

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Wednesday, December 16, 2015 9:09:33 AM

Item ID: D412-664-403  
Revision ID: URF 15-561  
Item Name: 412 Stainless Steel Aft Crosstubes - High

Accept

**\*N900040100\***Setup Start **\*NS1\***Stop **\*NS2\***Start Date: 12/16/2015 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 12/16/2015 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: Date:

Tooling: Date:

Run Start **\*NR1\***

QC: Date:

SPC (Y/N): Date:

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

128

0.00

**\*128\***

Crosstubes

Crosstubes

Memo

0.01

CUT TUBE AT HEIGHT ON FAI SHEET

VERF HEIGHT 24.375 BY QC 15 LEVEL INSPECTOR mmml— VERF TWIST .458" BY QC15 LEVEL INSPECTOR mmml

BCL 15/12/18

130

0.00

**\*130\***

Crosstubes

Crosstubes

Crosstubes

Memo

0.03

1- Drill Tube as per Dwg D412-664-443 Using DT \_\_\_\_\_ Drill Jigs,  
Set-up drill table as per QSI 010

2 -Deburr

3- Engrave Part # and Batch # as per Dwg D412-664-443

4-Remove all marks from tube within limits of D412-664-43 DWG.

BCL 16/01/04

PP 16-07-27  
THDAS  
12  
9-890.375"  
MAX  
TWIST



DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: BAW Date: DEC 22 2016**WORK ORDER NON-CONFORMANCE / UPDATE**Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| Work Order: <u>139982</u><br>Part No. <u>D412-664-Y03</u><br>NCR No. <u>16-6199</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>DISPOSITION</b><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input checked="" type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><table style="width:100%; font-size: small;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Cross tube <input checked="" type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> |                                                            |                                                                                   |                          | Skid-tube <input type="checkbox"/> | Cross tube <input checked="" type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |                          |          |                                     |                 |                          |                    |                          |                  |                          |                  |                          |         |                          |     |                          |                     |                          |            |                          |                     |                          |                  |                          |                       |                          |               |                          |          |                          |                  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| Skid-tube <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| Machining <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Small Fab <input type="checkbox"/>                                                                                                                                                        | Prod. Eng. Coord. <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quality <input type="checkbox"/>                           |                                                                                   |                          |    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| Thermoforming <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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       |                       |                          |                  |                          |
| Large Fab <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| Date: <u>16/3/15</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| <u>Twist after bending is 0.45%</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                           | <u>Acceptable. Within what has been shipped in the past without assembly issue.</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            | Lead hand / Supervisor Approval Verification<br><u>DAS 9 9-89</u> <u>16-11-14</u> |                          |        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| <b>Root Cause</b><br><table style="width:100%; font-size: x-small;"> <tr><td>Environment</td><td><input type="checkbox"/></td><td>No Re-verification</td><td><input type="checkbox"/></td></tr> <tr><td>Design</td><td><input type="checkbox"/></td><td>Operator</td><td><input type="checkbox"/></td></tr> <tr><td>Doc/Data</td><td><input type="checkbox"/></td><td>Offset/Setup</td><td><input type="checkbox"/></td></tr> <tr><td>Equip/Tooling</td><td><input type="checkbox"/></td><td>Supplier</td><td><input type="checkbox"/></td></tr> <tr><td>Handling/Pre</td><td><input type="checkbox"/></td><td>Training</td><td><input type="checkbox"/></td></tr> <tr><td>Material</td><td><input checked="" type="checkbox"/></td><td>Use for Testing</td><td><input type="checkbox"/></td></tr> <tr><td>Internal Transport</td><td><input type="checkbox"/></td><td>Poor Information</td><td><input type="checkbox"/></td></tr> <tr><td>Tribal Knowledge</td><td><input type="checkbox"/></td><td>Rushing</td><td><input type="checkbox"/></td></tr> <tr><td>LOA</td><td><input type="checkbox"/></td><td>Product Improvement</td><td><input type="checkbox"/></td></tr> <tr><td>Substation</td><td><input type="checkbox"/></td><td>Process Improvement</td><td><input type="checkbox"/></td></tr> <tr><td>Past Expiry Date</td><td><input type="checkbox"/></td><td>Manufacturing Process</td><td><input type="checkbox"/></td></tr> <tr><td>Misidentified</td><td><input type="checkbox"/></td><td>Past Due</td><td><input type="checkbox"/></td></tr> </table> |                                                                                                                                                                                           | Environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <input type="checkbox"/>                                   | No Re-verification                                                                | <input type="checkbox"/> | Design                             | <input type="checkbox"/>                       | Operator                           | <input type="checkbox"/>             | Doc/Data                           | <input type="checkbox"/>           | Offset/Setup                               | <input type="checkbox"/>         | Equip/Tooling                          | <input type="checkbox"/>           | Supplier                                     | <input type="checkbox"/>       | Handling/Pre                       | <input type="checkbox"/>           | Training                          | <input type="checkbox"/> | Material | <input checked="" type="checkbox"/> | Use for Testing | <input type="checkbox"/> | Internal Transport | <input type="checkbox"/> | Poor Information | <input type="checkbox"/> | Tribal Knowledge | <input type="checkbox"/> | Rushing | <input type="checkbox"/> | LOA | <input type="checkbox"/> | Product Improvement | <input type="checkbox"/> | Substation | <input type="checkbox"/> | Process Improvement | <input type="checkbox"/> | Past Expiry Date | <input type="checkbox"/> | Manufacturing Process | <input type="checkbox"/> | Misidentified | <input type="checkbox"/> | Past Due | <input type="checkbox"/> | <b>FAULT CATEGORY</b><br><table style="width:100%; font-size: x-small;"> <tr><td>Pressure/Forced</td><td><input type="checkbox"/></td><td>Temperature/Cure</td><td><input type="checkbox"/></td><td>Power Loss/Surge</td><td><input type="checkbox"/></td><td>Positioned Wrong</td><td><input type="checkbox"/></td></tr> <tr><td>Bending</td><td><input checked="" type="checkbox"/></td><td>Set-up</td><td><input type="checkbox"/></td><td>Folio/Program</td><td><input type="checkbox"/></td><td>Outside Dimensions</td><td><input type="checkbox"/></td></tr> <tr><td>Centre Not Concentric</td><td><input type="checkbox"/></td><td>BOM/Route</td><td><input type="checkbox"/></td><td>Grain</td><td><input type="checkbox"/></td><td>Over/Under tolerance</td><td><input type="checkbox"/></td></tr> <tr><td>Cracks</td><td><input type="checkbox"/></td><td>Broken/Damage/Defect</td><td><input type="checkbox"/></td><td>Weld</td><td><input type="checkbox"/></td><td>Part Incorrect</td><td><input type="checkbox"/></td></tr> <tr><td>Crimp/Kink/Ripple/Wave</td><td><input type="checkbox"/></td><td>Inspection Incomplete/Unqualified</td><td><input type="checkbox"/></td><td>Wrong Stock Pulled</td><td><input type="checkbox"/></td><td>Part Lost/Missing</td><td><input type="checkbox"/></td></tr> <tr><td>Cuffs</td><td><input type="checkbox"/></td><td>Contamination</td><td><input type="checkbox"/></td><td>Out of Sequence</td><td><input type="checkbox"/></td><td>Part Moved</td><td><input type="checkbox"/></td></tr> <tr><td>Crushing</td><td><input type="checkbox"/></td><td>Countersink</td><td><input type="checkbox"/></td><td>Off-set</td><td><input type="checkbox"/></td><td>Drawing</td><td><input type="checkbox"/></td></tr> <tr><td>Heat Treat</td><td><input type="checkbox"/></td><td>Cut Too Short</td><td><input type="checkbox"/></td><td>Mislabeled</td><td><input type="checkbox"/></td><td>Finish</td><td><input type="checkbox"/></td></tr> <tr><td>Wave/Twist in Tube</td><td><input type="checkbox"/></td><td>Instructions Incomplete/Unclear</td><td><input type="checkbox"/></td><td>Fit/Function</td><td><input type="checkbox"/></td><td>Misread</td><td><input type="checkbox"/></td></tr> <tr><td>Marks/Chatter</td><td><input type="checkbox"/></td><td>Drill Holes</td><td><input type="checkbox"/></td><td>Misaligned/off center</td><td><input type="checkbox"/></td><td>Turning Sequence</td><td><input type="checkbox"/></td></tr> </table> |  |  | Pressure/Forced | <input type="checkbox"/> | Temperature/Cure | <input type="checkbox"/> | Power Loss/Surge | <input type="checkbox"/> | Positioned Wrong | <input type="checkbox"/> | Bending | <input checked="" type="checkbox"/> | Set-up | <input type="checkbox"/> | Folio/Program | <input type="checkbox"/> | Outside Dimensions | <input type="checkbox"/> | Centre Not Concentric | <input type="checkbox"/> | BOM/Route | <input type="checkbox"/> | Grain | <input type="checkbox"/> | Over/Under tolerance | <input type="checkbox"/> | Cracks | <input type="checkbox"/> | Broken/Damage/Defect | <input type="checkbox"/> | Weld | <input type="checkbox"/> | Part Incorrect | <input type="checkbox"/> | Crimp/Kink/Ripple/Wave | <input type="checkbox"/> | Inspection Incomplete/Unqualified | <input type="checkbox"/> | Wrong Stock Pulled | <input type="checkbox"/> | Part Lost/Missing | <input type="checkbox"/> | Cuffs | <input type="checkbox"/> | Contamination | <input type="checkbox"/> | Out of Sequence | <input type="checkbox"/> | Part Moved | <input type="checkbox"/> | Crushing | <input type="checkbox"/> | Countersink | <input type="checkbox"/> | Off-set | <input type="checkbox"/> | Drawing | <input type="checkbox"/> | Heat Treat | <input type="checkbox"/> | Cut Too Short | <input type="checkbox"/> | Mislabeled | <input type="checkbox"/> | Finish | <input type="checkbox"/> | Wave/Twist in Tube | <input type="checkbox"/> | Instructions Incomplete/Unclear | <input type="checkbox"/> | Fit/Function | <input type="checkbox"/> | Misread | <input type="checkbox"/> | Marks/Chatter | <input type="checkbox"/> | Drill Holes | <input type="checkbox"/> | Misaligned/off center | <input type="checkbox"/> | Turning Sequence | <input type="checkbox"/> |
| Environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| Internal Transport                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| Tribal Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| Substation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| Past Expiry Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| Misidentified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| Pressure/Forced                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| Bending                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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                      |                                        |                                    |                                              |                                |                                    |                                    |                                   |                          |          |                                     |                 |                          |                    |                          |                  |                          |                  |                          |         |                          |     |                          |                     |                          |            |                          |                     |                          |                  |                          |                       |                          |               |                          |          |                          |                                                               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| Centre Not Concentric                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Cracks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| Crimp/Kink/Ripple/Wave                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| Cuffs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Crushing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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       |                       |                          |                  |                          |
| Heat Treat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/>                                                                                                                                                                  | Cut Too Short                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/>                                   | Mislabeled                                                                        | <input type="checkbox"/> | Finish                             | <input type="checkbox"/>                       |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |                          |          |                                     |                 |                          |                    |                          |                  |                          |                  |                          |         |                          |     |                          |                     |                          |            |                          |                     |                          |                  |                          |                       |                          |               |                          |          |                          |                                                               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       |                       |                          |                  |                          |
| Wave/Twist in Tube                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/>                                                                                                                                                                  | Instructions Incomplete/Unclear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/>                                   | Fit/Function                                                                      | <input type="checkbox"/> | Misread                            | <input type="checkbox"/>                       |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |                          |          |                                     |                 |                          |                    |                          |                  |                          |                  |                          |         |                          |     |                          |                     |                          |            |                          |                     |                          |                  |                          |                       |                          |               |                          |          |                          |                                                               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       |                       |                          |                  |                          |
| Marks/Chatter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <input type="checkbox"/>                                                                                                                                                                  | Drill Holes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <input type="checkbox"/>                                   | Misaligned/off center                                                             | <input type="checkbox"/> | Turning Sequence                   | <input type="checkbox"/>                       |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |                          |          |                                     |                 |                          |                    |                          |                  |                          |                  |                          |         |                          |     |                          |                     |                          |            |                          |                     |                          |                  |                          |                       |                          |               |                          |          |                          |                                                               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       |                       |                          |                  |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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       |                       |                          |                  |                          |



**Work Order ID 139982****\*139982\***

Page 3

Wednesday, December 16, 2015 9:09:33 AM

Item ID: D412-664-403

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID: URF 15-561

Stop

**\*NS2\***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 12/16/2015 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

140

QC6- Inspect dimensions to drawing

0.00

**\*140\***

QC

Memo

0.00

Quality Control

DAS

38

9-89

JUL 26 2016

174

Outsource process - NDT per QSI038 4.1

0.00

**\*174\***

Outsource2

Memo

3.00

Outsource process - NDT

ISSUE P/O TO ACCUREN:

33169u 16.0726

176

Receive &amp; Inspect for Damage &amp; Mat'l Certs

0.00

**\*176\***

Packaging

Memo

0.00

Packaging

u 16.0726

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                               |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |  |  |                                                                                                                                                               |  |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | Step #:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  | <b>MRB (QS1042) Approval</b><br><br><b>Completed By</b><br><br><b>Lead hand / Supervisor Approval Verification</b><br><br><b>QC / QA Coordinator Approval</b> |  |  |
| <b>Description Work Order Deviation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | <b>Disposition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |                                                                                                                                                               |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                               |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                               |  |  |
| <b>Root Cause</b><br><br><div style="display: flex;"> <div style="width: 50%;">           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div style="width: 50%;">           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |  | <b>FAULT CATEGORY</b><br><br><div style="display: flex;"> <div style="width: 33%;">           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div style="width: 33%;">           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div style="width: 33%;">           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Misabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div style="width: 33%;">           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                               |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | OTHER : <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                               |  |  |

**Work Order ID 139982****\*139982\***

Page 4

Wednesday, December 16, 2015 9:09:33 AM

Item ID: D412-664-403

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID: URF 15-561

Stop

**\*NS2\***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 12/16/2015 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

178

QC5- Inspect part completeness to step on W/O

0.00

**\*178\***

QC

Memo

0.00

Quality Control

DAS  
16  
9-89  
10/10/03

180

SprayPaint

0.00

**\*180\***

SprayPaint

Memo

0.01

Spray Painting

1-Prime inside &amp; outside crosstube as per QSI 005 4.2

BATCH: 135654

2- MASK UNDERSIDE OF CROSSTUBE AS SHOWN ON DWG BEFORE PAINTING

3 -Paint Outside of Tube as per Dart QSI 005 4.2

BATCH: 135302

4- After painting remove masking and apply matte clear coat per QSI005 4.2

CLEAR BATCH: 135516

20.10.16



DQA:

Date: 2017-02-22



QA Closed:

Date: JAN - 9 2017

## WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only ☐

|                                             |                                                           |                                                 |                                                            |                                                      |                                               |                                              |                                              |                                              |                                               |                                                |                                             |
|---------------------------------------------|-----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------|-----------------------------------------------|------------------------------------------------|---------------------------------------------|
| Work Order: 139982                          |                                                           | DISPOSITION                                     |                                                            | AGAINST DEPARTMENT/PROCESS                           |                                               |                                              |                                              |                                              |                                               |                                                |                                             |
| Part No: 0412-664-403                       |                                                           | Rework <input checked="" type="checkbox"/>      |                                                            | Skid-tube <input type="checkbox"/>                   | Cross tube <input type="checkbox"/>           | Water Jet <input type="checkbox"/>           | Engineering <input type="checkbox"/>         |                                              |                                               |                                                |                                             |
| NCR No: 17-6210                             |                                                           | Scrap <input type="checkbox"/>                  |                                                            | Machining <input type="checkbox"/>                   | Small Fab <input type="checkbox"/>            | Prod. Eng. Coord. <input type="checkbox"/>   | Quality <input checked="" type="checkbox"/>  |                                              |                                               |                                                |                                             |
|                                             |                                                           | Use-as-is <input type="checkbox"/>              |                                                            | Thermoforming <input type="checkbox"/>               | Finishing <input type="checkbox"/>            | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/>               |                                              |                                               |                                                |                                             |
|                                             |                                                           | Suspected Unapproved <input type="checkbox"/>   |                                                            | Large Fab <input type="checkbox"/>                   | Composite <input type="checkbox"/>            | Supplier <input type="checkbox"/>            |                                              |                                              |                                               |                                                |                                             |
| Date: 15/12/17                              | Step #: 180                                               | QTY Effective: ①                                |                                                            |                                                      |                                               | MRB (QSI042) Approval                        |                                              |                                              |                                               |                                                |                                             |
| Description Work Order Deviation            |                                                           |                                                 |                                                            | Disposition                                          |                                               |                                              |                                              | DAS 12 9-89 5/12/17                          |                                               |                                                |                                             |
| USE AXALTA PER QSI ODS                      |                                                           |                                                 |                                                            | AXALTA 132055 B/N: 132520<br>AXALTA 2305 B/N: 132474 |                                               |                                              |                                              | DAS 41 9-89 16-10-25<br>Completed By         |                                               |                                                |                                             |
|                                             |                                                           |                                                 |                                                            |                                                      |                                               |                                              |                                              | Lead hand / Supervisor Approval Verification |                                               |                                                |                                             |
|                                             |                                                           |                                                 |                                                            |                                                      |                                               |                                              |                                              | DAS 9 9-89 16-11-14                          |                                               |                                                |                                             |
|                                             |                                                           |                                                 |                                                            |                                                      |                                               |                                              |                                              | QC / QA Coordinator Approval                 |                                               |                                                |                                             |
|                                             |                                                           |                                                 |                                                            |                                                      |                                               |                                              |                                              | DAS 9 9-89 16-11-14                          |                                               |                                                |                                             |
| Root Cause                                  |                                                           | FAULT CATEGORY                                  |                                                            |                                                      |                                               |                                              |                                              |                                              |                                               |                                                |                                             |
| Environment <input type="checkbox"/>        | No Re-verification <input type="checkbox"/>               | Pressure/Forced <input type="checkbox"/>        | Temperature/Cure <input type="checkbox"/>                  | Power Loss/Surge <input type="checkbox"/>            | Positioned Wrong <input type="checkbox"/>     | Design <input type="checkbox"/>              | Operator <input type="checkbox"/>            | Bending <input type="checkbox"/>             | Set-up <input type="checkbox"/>               | Folio/Program <input type="checkbox"/>         | Outside Dimensions <input type="checkbox"/> |
| Doc/Data <input type="checkbox"/>           | Offset/Setup <input type="checkbox"/>                     | Centre Not Concentric <input type="checkbox"/>  | BOM/Route <input type="checkbox"/>                         | Grain <input type="checkbox"/>                       | Over/Under tolerance <input type="checkbox"/> | Equip/Tooling <input type="checkbox"/>       | Supplier <input type="checkbox"/>            | Cracks <input type="checkbox"/>              | Broken/Damage/Defect <input type="checkbox"/> | Weld <input type="checkbox"/>                  | Part Incorrect <input type="checkbox"/>     |
| Handling/Pre <input type="checkbox"/>       | Training <input type="checkbox"/>                         | Crimp/Kink/Ripple/Wave <input type="checkbox"/> | Inspection Incomplete/Unqualified <input type="checkbox"/> | Wrong Stock Pulled <input type="checkbox"/>          | Part Lost/Missing <input type="checkbox"/>    | Material <input type="checkbox"/>            | Use for Testing <input type="checkbox"/>     | Cuffs <input type="checkbox"/>               | Contamination <input type="checkbox"/>        | Out of Sequence <input type="checkbox"/>       | Part Moved <input type="checkbox"/>         |
| Internal Transport <input type="checkbox"/> | Poor Information <input type="checkbox"/>                 | Crushing <input type="checkbox"/>               | Countersink <input type="checkbox"/>                       | Off-set <input type="checkbox"/>                     | Drawing <input type="checkbox"/>              | Tribal Knowledge <input type="checkbox"/>    | Rushing <input type="checkbox"/>             | Heat Treat <input type="checkbox"/>          | Cut Too Short <input type="checkbox"/>        | Mislabeled <input type="checkbox"/>            | Finish <input checked="" type="checkbox"/>  |
| LOA <input type="checkbox"/>                | Product Improvement <input type="checkbox"/>              | Wave/Twist in Tube <input type="checkbox"/>     | Instructions Incomplete/Unclear <input type="checkbox"/>   | Fit/Function <input type="checkbox"/>                | Misread <input type="checkbox"/>              | Substation <input type="checkbox"/>          | Process Improvement <input type="checkbox"/> | Marks/Chatter <input type="checkbox"/>       | Drill Holes <input type="checkbox"/>          | Misaligned/off center <input type="checkbox"/> | Turning Sequence <input type="checkbox"/>   |
| Past Expiry Date <input type="checkbox"/>   | Manufacturing Process <input checked="" type="checkbox"/> |                                                 |                                                            |                                                      |                                               |                                              |                                              |                                              |                                               |                                                |                                             |
| Misidentified <input type="checkbox"/>      | Past Due <input type="checkbox"/>                         | OTHER :                                         |                                                            |                                                      |                                               |                                              |                                              |                                              |                                               |                                                |                                             |

**Work Order ID 139982**

Wednesday, December 16, 2015 9:09:33 AM

**\*139982\***

Page 5

Item ID: D412-664-403

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID: URF 15-561

Stop **\*NS2\***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 12/16/2015 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

|            |               |       |            |       |                        |
|------------|---------------|-------|------------|-------|------------------------|
| Approvals: | Process Plan: | Date: | Tooling:   | Date: | Run Start <b>*NR1*</b> |
|            | QC:           | Date: | SPC (Y/N): | Date: | Stop <b>*NR2*</b>      |

| Sequence ID/<br>Work Center ID | Operation<br>Description  | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|---------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 190                            | QC14- Inspect Spray Paint | 0.00                 |         |        |              |               |               |                  |                |
| <b>*190*</b>                   |                           |                      |         |        |              |               |               |                  |                |
| QC                             | Memo                      | 0.00                 |         |        |              |               |               |                  |                |
| Quality Control                |                           |                      |         |        |              |               |               |                  |                |

@ 16-10-28 PD

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Step #:                                                                                                                                                                            | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MRB (QSI042) Approval |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Completed By                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Lead hand / Supervisor Approval Verification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | QC / QA Coordinator Approval                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |  |
| <b>Root Cause</b><br><div style="display: flex; justify-content: space-between;"> <div>           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div>           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>FAULT CATEGORY</b><br><div style="display: flex; justify-content: space-between;"> <div>           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div>           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div>           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Mislabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div>           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |                       |  |
| OTHER : <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |  |



**Work Order ID 139982****\*139982\***

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Wednesday, December 16, 2015 9:09:33 AM

Item ID: D412-664-403

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID: URF 15-561

Stop

**\*NS2\***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 12/16/2015 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

200

0.00

**\*200\***

Crosstubes

Crosstubes

Memo

0.01

1- Install center support using scoth-weld DP460 per QSI 015, as per DWG. note 12. Install supports clamps using as per Dwg D412-644-443. Install clamp with rubber cushion as per DWG. note 13. \*\*\*ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT\*\*\* Torque clamps on support to 80-100 IN-LBS AS PER DWG.

A/R scoth-weld DP460

BATCH #:

134469

EXP DATE:

4/17

2- \*\*IF NOT ALREADY PRESENT ON CHAFFING SHEILD\*\* Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG.

A/R Proseal 890

Batch:

135390

EXP DATE:

12/16

AFTER FINISH CURE TIME 24H

START CURE TIME: 27.10.16FINISH CURE TIME: 28.10.16

PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.



DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                              |                                                |                                                                                                                                                                                    |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |  |  |                                                                                                                                                     |  |
|--------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |                                                | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |                                                            | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>             Skid-tube <input type="checkbox"/><br/>             Machining <input type="checkbox"/><br/>             Thermoforming <input type="checkbox"/><br/>             Large Fab <input type="checkbox"/> </div> <div>             Cross tube <input type="checkbox"/><br/>             Small Fab <input type="checkbox"/><br/>             Finishing <input type="checkbox"/><br/>             Composite <input type="checkbox"/> </div> <div>             Water Jet <input type="checkbox"/><br/>             Prod. Eng. Coord. <input type="checkbox"/><br/>             Rec/Store/Packaging <input type="checkbox"/><br/>             Supplier <input type="checkbox"/> </div> <div>             Engineering <input type="checkbox"/><br/>             Quality <input type="checkbox"/><br/>             Other <input type="checkbox"/> </div> </div> |                                               |  |  |                                                                                                                                                     |  |
| Date :                                                       |                                                | Step #:                                                                                                                                                                            |                                                            | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |  |  | MRB (QS1042) Approval<br><br><br>Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |  |
| Description Work Order Deviation                             |                                                |                                                                                                                                                                                    |                                                            | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                               |  |  |                                                                                                                                                     |  |
|                                                              |                                                |                                                                                                                                                                                    |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |  |  |                                                                                                                                                     |  |
|                                                              |                                                |                                                                                                                                                                                    |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |  |  |                                                                                                                                                     |  |
| Root Cause                                                   |                                                | FAULT CATEGORY                                                                                                                                                                     |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |  |  |                                                                                                                                                     |  |
| Environment <input type="checkbox"/>                         | No Re-verification <input type="checkbox"/>    | Pressure/Forced <input type="checkbox"/>                                                                                                                                           | Temperature/Cure <input type="checkbox"/>                  | Power Loss/Surge <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Positioned Wrong <input type="checkbox"/>     |  |  |                                                                                                                                                     |  |
| Design <input type="checkbox"/>                              | Operator <input type="checkbox"/>              | Bending <input type="checkbox"/>                                                                                                                                                   | Set-up <input type="checkbox"/>                            | Folio/Program <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Outside Dimensions <input type="checkbox"/>   |  |  |                                                                                                                                                     |  |
| Doc/Data <input type="checkbox"/>                            | Offset/Setup <input type="checkbox"/>          | Centre Not Concentric <input type="checkbox"/>                                                                                                                                     | BOM/Route <input type="checkbox"/>                         | Grain <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Over/Under tolerance <input type="checkbox"/> |  |  |                                                                                                                                                     |  |
| Equip/Tooling <input type="checkbox"/>                       | Supplier <input type="checkbox"/>              | Cracks <input type="checkbox"/>                                                                                                                                                    | Broken/Damage/Defect <input type="checkbox"/>              | Weld <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Part Incorrect <input type="checkbox"/>       |  |  |                                                                                                                                                     |  |
| Handling/Pre <input type="checkbox"/>                        | Training <input type="checkbox"/>              | Crimp/Kink/Ripple/Wave <input type="checkbox"/>                                                                                                                                    | Inspection Incomplete/Unqualified <input type="checkbox"/> | Wrong Stock Pulled <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Part Lost/Missing <input type="checkbox"/>    |  |  |                                                                                                                                                     |  |
| Material <input type="checkbox"/>                            | Use for Testing <input type="checkbox"/>       | Cuffs <input type="checkbox"/>                                                                                                                                                     | Contamination <input type="checkbox"/>                     | Out of Sequence <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Part Moved <input type="checkbox"/>           |  |  |                                                                                                                                                     |  |
| Internal Transport <input type="checkbox"/>                  | Poor Information <input type="checkbox"/>      | Crushing <input type="checkbox"/>                                                                                                                                                  | Countersink <input type="checkbox"/>                       | Off-set <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Drawing <input type="checkbox"/>              |  |  |                                                                                                                                                     |  |
| Tribal Knowledge <input type="checkbox"/>                    | Rushing <input type="checkbox"/>               | Heat Treat <input type="checkbox"/>                                                                                                                                                | Cut Too Short <input type="checkbox"/>                     | Mislabeled <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Finish <input type="checkbox"/>               |  |  |                                                                                                                                                     |  |
| LOA <input type="checkbox"/>                                 | Product Improvement <input type="checkbox"/>   | Wave/Twist in Tube <input type="checkbox"/>                                                                                                                                        | Instructions Incomplete/Unclear <input type="checkbox"/>   | Fit/Function <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Misread <input type="checkbox"/>              |  |  |                                                                                                                                                     |  |
| Substation <input type="checkbox"/>                          | Process Improvement <input type="checkbox"/>   | Marks/Chatter <input type="checkbox"/>                                                                                                                                             | Drill Holes <input type="checkbox"/>                       | Misaligned/off center <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Turning Sequence <input type="checkbox"/>     |  |  |                                                                                                                                                     |  |
| Past Expiry Date <input type="checkbox"/>                    | Manufacturing Process <input type="checkbox"/> | OTHER :                                                                                                                                                                            |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |  |  |                                                                                                                                                     |  |
| Misidentified <input type="checkbox"/>                       | Past Due <input type="checkbox"/>              |                                                                                                                                                                                    |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |  |  |                                                                                                                                                     |  |

**Work Order ID 139982****\*139982\***

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Wednesday, December 16, 2015 9:09:33 AM

Item ID: D412-664-403

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID: URF 15-561

Stop

**\*NS2\***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 12/16/2015 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00

**\*210\***

QC

Memo

0.00

Quality Control

PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER  
CURED FOR 24H.DAS  
38  
9-89  
27-10-16

220

Pick Kit

0.00

**\*220\***

Packaging

Memo

0.00

Packaging

NOV 04 2016

DAS  
6  
9-89  
DAS  
28  
9-89

230

QC4- 100% Inspect kits for completeness

0.00

**\*230\***

QC

Memo

0.00

Quality Control

DAS  
27  
9-89

NOV 07 2016



DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                              |                                             |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
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| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |                                             | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |                                           | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
| Date :                                                       |                                             | Step #:                                                                                                                                                                            |                                           | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |                                 |                                   | MRB (QS1042) Approval                                                                                              |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
| Description Work Order Deviation                             |                                             |                                                                                                                                                                                    |                                           | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |                                 |                                   | Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
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| Root Cause                                                   |                                             | FAULT CATEGORY                                                                                                                                                                     |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
| Environment <input type="checkbox"/>                         | No Re-verification <input type="checkbox"/> | Pressure/Forced <input type="checkbox"/>                                                                                                                                           | Temperature/Cure <input type="checkbox"/> | Power Loss/Surge <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Positioned Wrong <input type="checkbox"/> | Design <input type="checkbox"/> | Operator <input type="checkbox"/> | Bending <input type="checkbox"/>                                                                                   | Set-up <input type="checkbox"/> | Folio/Program <input type="checkbox"/> | Outside Dimensions <input type="checkbox"/> | Doc/Data <input type="checkbox"/> | Offset/Setup <input type="checkbox"/> | Centre Not Concentric <input type="checkbox"/> | BOM/Route <input type="checkbox"/> | Grain <input type="checkbox"/> | Over/Under tolerance <input type="checkbox"/> | Equip/Tooling <input type="checkbox"/> | Supplier <input type="checkbox"/> | Cracks <input type="checkbox"/> | Broken/Damage/Defect <input type="checkbox"/> | Weld <input type="checkbox"/> | Part Incorrect <input type="checkbox"/> | Handling/Pre <input type="checkbox"/> | Training <input type="checkbox"/> | Crimp/Kink/Ripple/Wave <input type="checkbox"/> | Inspection Incomplete/Unqualified <input type="checkbox"/> | Wrong Stock Pulled <input type="checkbox"/> | Part Lost/Missing <input type="checkbox"/> | Material <input type="checkbox"/> | Use for Testing <input type="checkbox"/> | Cuffs <input type="checkbox"/> | Contamination <input type="checkbox"/> | Out of Sequence <input type="checkbox"/> | Part Moved <input type="checkbox"/> | Internal Transport <input type="checkbox"/> | Poor Information <input type="checkbox"/> | Crushing <input type="checkbox"/> | Countersink <input type="checkbox"/> | Off-set <input type="checkbox"/> | Drawing <input type="checkbox"/> | Tribal Knowledge <input type="checkbox"/> | Rushing <input type="checkbox"/> | Heat Treat <input type="checkbox"/> | Cut Too Short <input type="checkbox"/> | Mislabeled <input type="checkbox"/> | Finish <input type="checkbox"/> | LOA <input type="checkbox"/> | Product Improvement <input type="checkbox"/> | Wave/Twist in Tube <input type="checkbox"/> | Instructions Incomplete/Unclear <input type="checkbox"/> | Fit/Function <input type="checkbox"/> | Misread <input type="checkbox"/> | Substation <input type="checkbox"/> | Process Improvement <input type="checkbox"/> | Marks/Chatter <input type="checkbox"/> | Drill Holes <input type="checkbox"/> | Misaligned/off center <input type="checkbox"/> | Turning Sequence <input type="checkbox"/> | Past Expiry Date <input type="checkbox"/> | Manufacturing Process <input type="checkbox"/> | OTHER : |  |
| Misidentified <input type="checkbox"/>                       | Past Due <input type="checkbox"/>           |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |

**Work Order ID 139982**

Wednesday, December 16, 2015 9:09:33 AM

**\*139982\***

Page 8

Item ID: D412-664-403

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID: URF 15-561

Stop

**\*NS2\***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 12/16/2015 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

240

0.00

**\*240\***

Packaging

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPPD412-664-443

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

**Sold**DAS  
28  
9-89  
NOV 07 2016  
DAS  
27  
9-89

250

0.00

**\*250\***

QC

QC21- Final Inspection - Work Order Release

Memo

0.00

Quality Control

DAS  
21  
9-89  
NOV 07 2016DAS  
21  
9-89  
NOV 07 2016

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |  |                                                                                                                                                     |  |
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| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>             Skid-tube <input type="checkbox"/><br/>             Machining <input type="checkbox"/><br/>             Thermoforming <input type="checkbox"/><br/>             Large Fab <input type="checkbox"/> </div> <div>             Cross tube <input type="checkbox"/><br/>             Small Fab <input type="checkbox"/><br/>             Finishing <input type="checkbox"/><br/>             Composite <input type="checkbox"/> </div> <div>             Water Jet <input type="checkbox"/><br/>             Prod. Eng. Coord. <input type="checkbox"/><br/>             Rec/Store/Packaging <input type="checkbox"/><br/>             Supplier <input type="checkbox"/> </div> <div>             Engineering <input type="checkbox"/><br/>             Quality <input type="checkbox"/><br/>             Other <input type="checkbox"/> </div> </div> |  |  |  |                                                                                                                                                     |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | Step #:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |  | MRB (QSI042) Approval<br><br><br>Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |                                                                                                                                                     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |  |                                                                                                                                                     |  |
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| <b>Root Cause</b><br><br><div style="display: flex;"> <div style="width: 50%;">             Environment <input type="checkbox"/><br/>             Design <input type="checkbox"/><br/>             Doc/Data <input type="checkbox"/><br/>             Equip/Tooling <input type="checkbox"/><br/>             Handling/Pre <input type="checkbox"/><br/>             Material <input type="checkbox"/><br/>             Internal Transport <input type="checkbox"/><br/>             Tribal Knowledge <input type="checkbox"/><br/>             LOA <input type="checkbox"/><br/>             Substation <input type="checkbox"/><br/>             Past Expiry Date <input type="checkbox"/><br/>             Misidentified <input type="checkbox"/> </div> <div style="width: 50%;">             No Re-verification <input type="checkbox"/><br/>             Operator <input type="checkbox"/><br/>             Offset/Setup <input type="checkbox"/><br/>             Supplier <input type="checkbox"/><br/>             Training <input type="checkbox"/><br/>             Use for Testing <input type="checkbox"/><br/>             Poor Information <input type="checkbox"/><br/>             Rushing <input type="checkbox"/><br/>             Product Improvement <input type="checkbox"/><br/>             Process Improvement <input type="checkbox"/><br/>             Manufacturing Process <input type="checkbox"/><br/>             Past Due <input type="checkbox"/> </div> </div> |  | <b>FAULT CATEGORY</b><br><br><div style="display: flex;"> <div style="width: 33%;">             Pressure/Forced <input type="checkbox"/><br/>             Bending <input type="checkbox"/><br/>             Centre Not Concentric <input type="checkbox"/><br/>             Cracks <input type="checkbox"/><br/>             Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>             Cuffs <input type="checkbox"/><br/>             Crushing <input type="checkbox"/><br/>             Heat Treat <input type="checkbox"/><br/>             Wave/Twist in Tube <input type="checkbox"/><br/>             Marks/Chatter <input type="checkbox"/> </div> <div style="width: 33%;">             Temperature/Cure <input type="checkbox"/><br/>             Set-up <input type="checkbox"/><br/>             BOM/Route <input type="checkbox"/><br/>             Broken/Damage/Defect <input type="checkbox"/><br/>             Inspection Incomplete/Unqualified <input type="checkbox"/><br/>             Contamination <input type="checkbox"/><br/>             Countersink <input type="checkbox"/><br/>             Cut Too Short <input type="checkbox"/><br/>             Instructions Incomplete/Unclear <input type="checkbox"/><br/>             Drill Holes <input type="checkbox"/> </div> <div style="width: 33%;">             Power Loss/Surge <input type="checkbox"/><br/>             Folio/Program <input type="checkbox"/><br/>             Grain <input type="checkbox"/><br/>             Weld <input type="checkbox"/><br/>             Wrong Stock Pulled <input type="checkbox"/><br/>             Out of Sequence <input type="checkbox"/><br/>             Off-set <input type="checkbox"/><br/>             Misabeled <input type="checkbox"/><br/>             Fit/Function <input type="checkbox"/><br/>             Misaligned/off center <input type="checkbox"/> </div> <div style="width: 33%;">             Positioned Wrong <input type="checkbox"/><br/>             Outside Dimensions <input type="checkbox"/><br/>             Over/Under tolerance <input type="checkbox"/><br/>             Part Incorrect <input type="checkbox"/><br/>             Part Lost/Missing <input type="checkbox"/><br/>             Part Moved <input type="checkbox"/><br/>             Drawing <input type="checkbox"/><br/>             Finish <input type="checkbox"/><br/>             Misread <input type="checkbox"/><br/>             Turning Sequence <input type="checkbox"/> </div> </div> |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |  |                                                                                                                                                     |  |
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# Picklist Print

Wednesday, December 16, 2015 9:09:39 AM

Page 1

Work Order ID: 139982

\*139982\*

Parent Item: D412-664-403

\*D412-664-403\*

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015

Required Date: 12/16/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A 13.10.25 NEW ISSUE DD VERF:JLM

| Component Item ID/<br>Item Name | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand | Qty per Kit | Total<br>Qty | Qty<br>Issued | Date<br>Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|

D412-664-443TRN

Manufactured

No

110

Each

2.0000

1

1

\*D412-664-443TRN\*

Crosstube Turning Detail

R136 980

\*\*

1 1 BL 15/12/17

Location

Loc Qty

Loc Code

LG003

2

132991

1

136982

1

D3595-063-530

Manufactured

No

200

Each

38.0000

2

2

\*D3595-063-530\*

Rubber Cushion 0.63" wide x 5.30" Long

\*\*

MA 27-10-16

Location

Loc Qty

Loc Code

FG

1

82656

1

LG051

37

132515

37

D4909-1

Manufactured

No

200

Each

8.0000

1

1

\*D4909-1\*

Support

140154 -1

\*\*

1 MA 27-10-16

Location

Loc Qty

Loc Code

LG053

8

135507

8

D4910-1

Manufactured

No

200

Each

4.0000

2

2

\*D4910-1\*

Chaffing Shield

\*\*

2 MA 27-10-16

Location

Loc Qty

Loc Code

LG054

4

135444

4

141315

2

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                    |  |
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| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                                                                                    |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Step #:                                                                                                                                                                            | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | MRB (QSI042) Approval                                                                                              |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                    | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                    |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                    |  |
| <b>Root Cause</b><br><div style="display: flex;"> <div style="flex: 1;">           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div style="flex: 1;">           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |                                                                                                                                                                                    | <b>FAULT CATEGORY</b><br><div style="display: flex;"> <div style="flex: 1;">           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div style="flex: 1;">           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div style="flex: 1;">           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Misabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div style="flex: 1;">           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |  |                                                                                                                    |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    | OTHER : <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                                                                                    |  |

# Picklist Print

Wednesday, December 16, 2015 9:09:39 AM

Work Order ID: 139982

\*139982\*

Parent Item: D412-664-403

\*D412-664-403\*

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015

Required Date: 12/16/2015

Start Qty: 1.00

Required Qty: 1.00

MS21920-26

Purchased

No

200

Each

39.0000

4

4

\*MS21920-26\*

Clamp

\*\*

4

27-10-16

Location

Loc Qty

Loc Code

LG057

39

M132045

1

M133234

2

M133483

16

M133577

20

134502-4

200

Each

74.0000

2

2

MS21920-28

Purchased

No

\*MS21920-28\*

Clamp

\*\*

2

27-10-16

Location

Loc Qty

Loc Code

FG

1

105884

1

LG051

1

M132169

1

LG057

72

M130400

50

M133090

22

AN6-40A

Purchased

No

220

Each

126.0000

4

4

\*AN6-40A\*

3/8-24 BOLT X 3" LONG

\*\*

134509

NOV 04 2016

DAS 6 9-89

DAS 28 9-89

Location

Loc Qty

Loc Code

over005

74

M133316

24

M133769

50

ST333

52

M131803

52

AS 27 9-89

DAS 27 9-89



DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                    |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>             Skid-tube <input type="checkbox"/><br/>             Machining <input type="checkbox"/><br/>             Thermoforming <input type="checkbox"/><br/>             Large Fab <input type="checkbox"/> </div> <div>             Cross tube <input type="checkbox"/><br/>             Small Fab <input type="checkbox"/><br/>             Finishing <input type="checkbox"/><br/>             Composite <input type="checkbox"/> </div> <div>             Water Jet <input type="checkbox"/><br/>             Prod. Eng. Coord. <input type="checkbox"/><br/>             Rec/Store/Packaging <input type="checkbox"/><br/>             Supplier <input type="checkbox"/> </div> <div>             Engineering <input type="checkbox"/><br/>             Quality <input type="checkbox"/><br/>             Other <input type="checkbox"/> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |                                                                                                                    |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Step #:                                                                                                                                                                            | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | MRB (QSI042) Approval                                                                                              |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                    | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                    |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                    |  |
| <b>Root Cause</b><br><div style="display: flex;"> <div style="flex: 1;">           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div style="flex: 1;">           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |                                                                                                                                                                                    | <b>FAULT CATEGORY</b><br><div style="display: flex;"> <div style="flex: 1;">           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div style="flex: 1;">           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div style="flex: 1;">           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Misabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div style="flex: 1;">           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |  |                                                                                                                    |  |
| OTHER : <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                    |  |

# Picklist Print

Wednesday, December 16, 2015 9:09:39 AM

Page 3

Work Order ID: 139982

\*139982\*

Parent Item: D412-664-403

\*D412-664-403\*

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 12/16/2015

Required Date: 12/16/2015

Start Qty: 1.00

Required Qty: 1.00

AN6-41A

Purchased

No

220

Each

65.0000

2

2

**\*AN6-41A\***

Bolt

\*\*

134509  
135408

NOV 04 2016

DAS 628 9-89

Location

Loc Qty

Loc Code

over005

25

M133577

25

ST286A

1

M129913

1

ST333

39

M131957

39

AN960JD616

NAS1149D0663J

Purchased

No

220

Each

0.0000

18

18

**\*AN960JD616\***

Washer

MS21042L6

Purchased

No

220

Each

202.0000

6

6

**\*MS21042L6\***

Nut

\*\*

135412

NOV 04 2016

DAS 628 9-89

Location

Loc Qty

Loc Code

CCK007

100

m133134

100

ST303

81

m131624

6

m133483

25

m133577

50

ST305

4

m132262

4

t260a

17

m131317

17

NOV 04 2016

DAS 628 9-89

Wednesday, December 16, 2015 9:09:39 AM

Shop Packet Print

Page 3

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

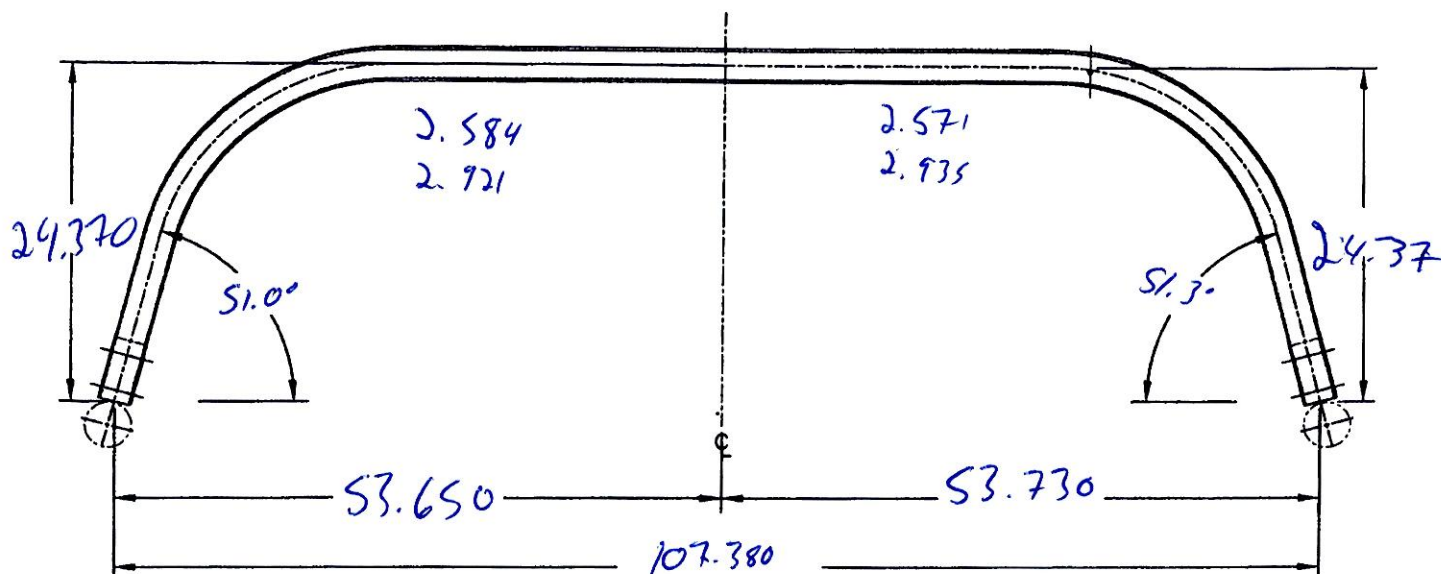
|                                                              |  |                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |                                                                                                                                                  |  |  |
|--------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |  | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>             Skid-tube <input type="checkbox"/><br/>             Machining <input type="checkbox"/><br/>             Thermoforming <input type="checkbox"/><br/>             Large Fab <input type="checkbox"/> </div> <div>             Cross tube <input type="checkbox"/><br/>             Small Fab <input type="checkbox"/><br/>             Finishing <input type="checkbox"/><br/>             Composite <input type="checkbox"/> </div> <div>             Water Jet <input type="checkbox"/><br/>             Prod. Eng. Coord. <input type="checkbox"/><br/>             Rec/Store/Packaging <input type="checkbox"/><br/>             Supplier <input type="checkbox"/> </div> <div>             Engineering <input type="checkbox"/><br/>             Quality <input type="checkbox"/><br/>             Other <input type="checkbox"/> </div> </div> |  |  |                                                                                                                                                  |  |  |
| Date : _____                                                 |  | Step #: _____                                                                                                                                                                      |  | QTY Effective : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  | <b>MRB (QSI042) Approval</b><br><br><div style="border: 1px solid black; height: 150px; margin-top: 10px;"></div>                                |  |  |
| <b>Description Work Order Deviation</b>                      |  |                                                                                                                                                                                    |  | <b>Disposition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |                                                                                                                                                  |  |  |
|                                                              |  |                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |                                                                                                                                                  |  |  |
|                                                              |  |                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |                                                                                                                                                  |  |  |
|                                                              |  |                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  | <b>Completed By</b><br><br><div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div>                                           |  |  |
|                                                              |  |                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  | <b>Lead hand / Supervisor</b><br><b>Approval Verification</b><br><br><div style="border: 1px solid black; height: 60px; margin-top: 5px;"></div> |  |  |
|                                                              |  |                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  | <b>QC / QA Coordinator</b><br><b>Approval</b><br><br><div style="border: 1px solid black; height: 60px; margin-top: 5px;"></div>                 |  |  |

| Root Cause                                  |  |                                                | FAULT CATEGORY                                                                             |                                                            |                                                |                                               |  |  |
|---------------------------------------------|--|------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------|-----------------------------------------------|--|--|
| Environment <input type="checkbox"/>        |  | No Re-verification <input type="checkbox"/>    | Pressure/Forced <input type="checkbox"/>                                                   | Temperature/Cure <input type="checkbox"/>                  | Power Loss/Surge <input type="checkbox"/>      | Positioned Wrong <input type="checkbox"/>     |  |  |
| Design <input type="checkbox"/>             |  | Operator <input type="checkbox"/>              | Bending <input type="checkbox"/>                                                           | Set-up <input type="checkbox"/>                            | Folio/Program <input type="checkbox"/>         | Outside Dimensions <input type="checkbox"/>   |  |  |
| Doc/Data <input type="checkbox"/>           |  | Offset/Setup <input type="checkbox"/>          | Centre Not Concentric <input type="checkbox"/>                                             | BOM/Route <input type="checkbox"/>                         | Grain <input type="checkbox"/>                 | Over/Under tolerance <input type="checkbox"/> |  |  |
| Equip/Tooling <input type="checkbox"/>      |  | Supplier <input type="checkbox"/>              | Cracks <input type="checkbox"/>                                                            | Broken/Damage/Defect <input type="checkbox"/>              | Weld <input type="checkbox"/>                  | Part Incorrect <input type="checkbox"/>       |  |  |
| Handling/Pre <input type="checkbox"/>       |  | Training <input type="checkbox"/>              | Crimp/Kink/Ripple/Wave <input type="checkbox"/>                                            | Inspection Incomplete/Unqualified <input type="checkbox"/> | Wrong Stock Pulled <input type="checkbox"/>    | Part Lost/Missing <input type="checkbox"/>    |  |  |
| Material <input type="checkbox"/>           |  | Use for Testing <input type="checkbox"/>       | Cuffs <input type="checkbox"/>                                                             | Contamination <input type="checkbox"/>                     | Out of Sequence <input type="checkbox"/>       | Part Moved <input type="checkbox"/>           |  |  |
| Internal Transport <input type="checkbox"/> |  | Poor Information <input type="checkbox"/>      | Crushing <input type="checkbox"/>                                                          | Countersink <input type="checkbox"/>                       | Off-set <input type="checkbox"/>               | Drawing <input type="checkbox"/>              |  |  |
| Tribal Knowledge <input type="checkbox"/>   |  | Rushing <input type="checkbox"/>               | Heat Treat <input type="checkbox"/>                                                        | Cut Too Short <input type="checkbox"/>                     | Mislabeled <input type="checkbox"/>            | Finish <input type="checkbox"/>               |  |  |
| LOA <input type="checkbox"/>                |  | Product Improvement <input type="checkbox"/>   | Wave/Twist in Tube <input type="checkbox"/>                                                | Instructions Incomplete/Unclear <input type="checkbox"/>   | Fit/Function <input type="checkbox"/>          | Misread <input type="checkbox"/>              |  |  |
| Substation <input type="checkbox"/>         |  | Process Improvement <input type="checkbox"/>   | Marks/Chatter <input type="checkbox"/>                                                     | Drill Holes <input type="checkbox"/>                       | Misaligned/off center <input type="checkbox"/> | Turning Sequence <input type="checkbox"/>     |  |  |
| Past Expiry Date <input type="checkbox"/>   |  | Manufacturing Process <input type="checkbox"/> | <b>OTHER :</b> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div> |                                                            |                                                |                                               |  |  |
| Misidentified <input type="checkbox"/>      |  | Past Due <input type="checkbox"/>              |                                                                                            |                                                            |                                                |                                               |  |  |



|                                              |               |                                  |
|----------------------------------------------|---------------|----------------------------------|
| <b>DART AEROSPACE LTD</b>                    |               | <b>Work Order:</b> 139982        |
| <b>Description:</b> Crosstube High Aft (412) |               | <b>Part Number:</b> D412-664-403 |
| <b>Inspection Dwg:</b> D412-664-443          | <b>Rev:</b> A | <b>Page 1 of 1</b>               |

| Required Dimension | Min    | Max    |
|--------------------|--------|--------|
| Height             | 24.12  | 24.62  |
| 1/2 Span           | 53.56  | 53.82  |
| Angle              | 49°    | 52°    |
| Total Span         | 107.12 | 107.64 |
| Bending Passes     | 8      | --     |
| Crushing           | --     | 7%     |



|                | Side A | Side B |
|----------------|--------|--------|
| Bending Passes | 8      | 9      |
| Crushing       | 6.1%   | 6.6%   |
| Comments       |        |        |
| DAS            |        |        |
| 47             |        |        |

|                 |          |
|-----------------|----------|
| QC15 Inspection | 9-89     |
| Date            | 15-12-18 |

| Rev | Date     | Change    | Revised by | Approved |
|-----|----------|-----------|------------|----------|
| A   | 14.07.08 | New Issue | KJ         | UP       |

| Item | Qty         | Part Number       | Description                           |
|------|-------------|-------------------|---------------------------------------|
|      | <b>-443</b> |                   |                                       |
| 1    | X           | D412-664-443      | CROSSTUBE ASSEMBLY (412 HI AFT)       |
| 2    | 1           | D6020-132         | CROSSTUBE MATERIAL (132" MIN. LENGTH) |
| 3    | 2           | D3595-063-530     | RUBBER CUSHION                        |
| 4    | 1           | D4909-1           | SUPPORT                               |
| 5    | 2           | D4910-1           | CHAFING SHIELD                        |
| 7    | 4           | MS21920-26        | CLAMP                                 |
| 8    | 2           | MS21920-28        | CLAMP                                 |
| 9    | A/R         | SCOTCH-WELD DP460 | EPOXY ADHESIVE, 3M SCOTCH-WELD        |
| 10   | A/R         | PROSEAL 890       | SEALANT                               |

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6020-132  
FINISHED LENGTH = 130.10±0.060 (BEFORE BENDING/TRIMMING)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)  
PAINT OUTSIDE PER DART QSI 005 4.2  
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART P/N "D412-664-443" AND B/N ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 90.2 lb AFTER MACHINING  
88.7 lb FINISHED WEIGHT
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

#### BENDING

- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R35 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

#### ASSEMBLY

- 12) INSTALL D4909-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- 13) INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D4909-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT.
- 14) IF NOT ALREADY PRESENT ON CHAFING SHIELD, APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D4910-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D4910-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 15) TORQUE CLAMPS ON D4909-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D4910-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER

139982 MCLJ  
1512-16

UNDER REVIEW

4/15/4/24  
LRF 15-561

UNDER REVIEW

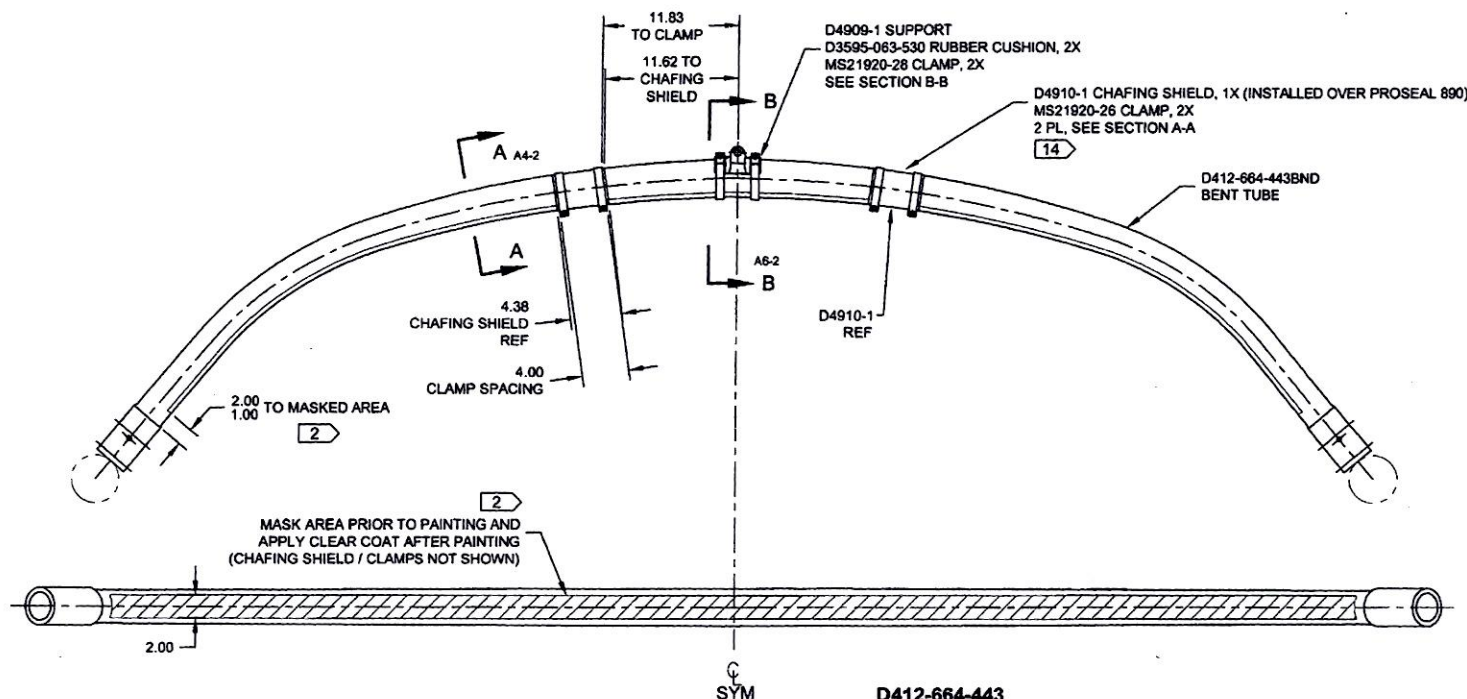
4/17/20  
LRF 15-691

RELEASED  
2014-05-26

|            |           |    |          |
|------------|-----------|----|----------|
| REV.       | NEW ISSUE | CP | 14.04.01 |
| DESIGN     |           | BY | DATE     |
| DRAWN      |           |    |          |
| CHECKED    |           |    |          |
| MFG. APPR. |           |    |          |
| APPROVED   |           |    |          |
| DE APPR.   |           |    |          |
| DATE       | 14.04.01  |    |          |

|                                                                                                                                                                                                                                                                              |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| DART AEROSPACE LTD<br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                            |                        |
| DRAWING NO.<br>D412-664-443                                                                                                                                                                                                                                                  | REV. A<br>SHEET 1 OF 4 |
| TITLE<br>CROSSTUBE ASSY (412 HI AFT)                                                                                                                                                                                                                                         | SCALE<br>NTS           |
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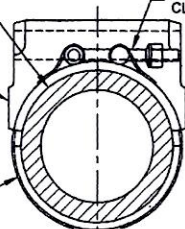


**D412-664-443**  
ASSEMBLY DETAIL

APPLY 3M SCOTCH-WELD DP460  
BETWEEN D4909-1 SUPPORT AND  
THE CROSSTUBE

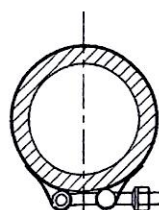
D4909-1  
SUPPORT  
REF

D3595-063-530  
RUBBER CUSHION  
UNDER CLAMP, REF



**SECTION B-B** D4-2  
SCALE 4X

MS21920-28  
CLAMP, REF



**SECTION A-A** C6-2  
SCALE 4X

MS21920-26 CLAMP  
REF

**UNDER REVIEW**

15/14/28

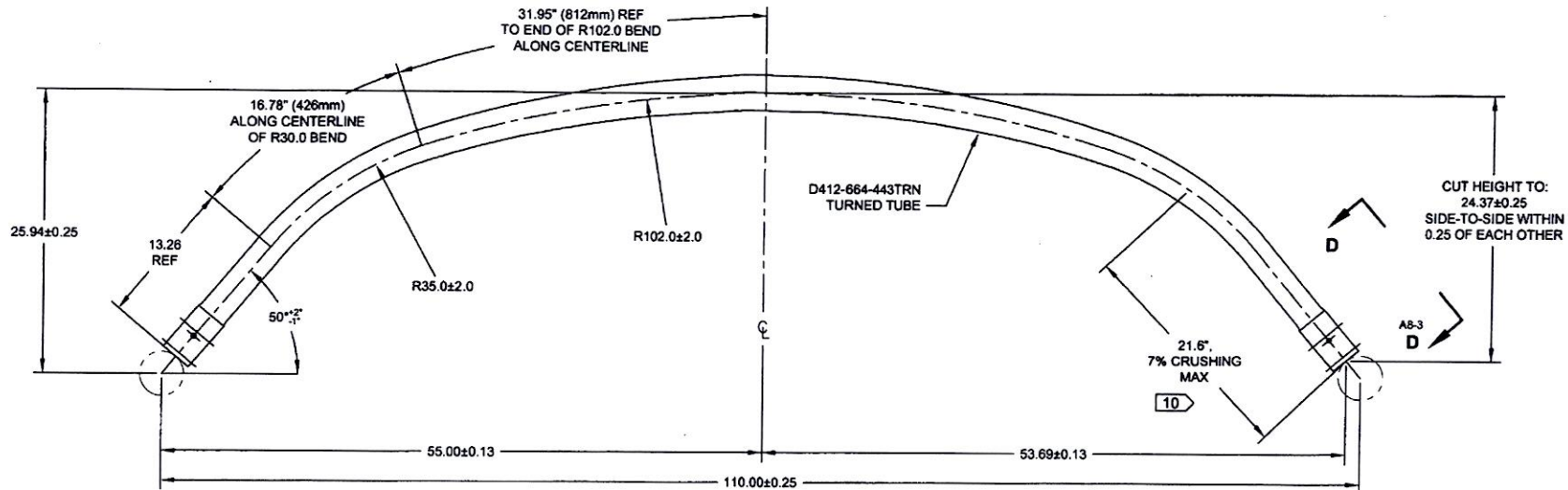
**UNDER REVIEW**

15/14/28

**RELEASED**  
2014-05-26

|                                                                                                                                                                                                                                        |           |                                        |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------|--------------|
| DESIGN                                                                                                                                                                                                                                 | <i>JP</i> | <b>DART AEROSPACE LTD</b>              |              |
| DRAWN                                                                                                                                                                                                                                  |           | HAWKESBURY, ONTARIO, CANADA            |              |
| CHECKED                                                                                                                                                                                                                                | <i>JP</i> | DRAWING NO.                            | REV. A       |
| MFG. APPR.                                                                                                                                                                                                                             | <i>JP</i> | D412-664-443                           | SHEET 2 OF 4 |
| APPROVED                                                                                                                                                                                                                               | <i>JP</i> | TITLE                                  | SCALE        |
| DE APPR.                                                                                                                                                                                                                               | <i>JP</i> | CROSSTUBE ASSY (412 HI AFT)            | NTS          |
| DATE                                                                                                                                                                                                                                   | 14.04.01  | COPYRIGHT © 2013 BY DART AEROSPACE LTD |              |
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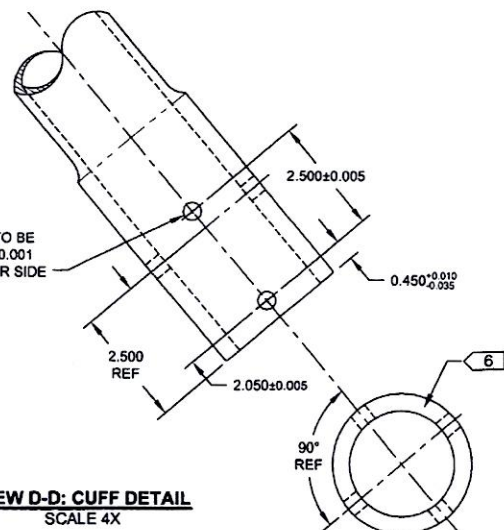




**D412-664-443BND**  
BENDING DETAIL

10

Ø0.386<sup>+0.005</sup><sub>-0.000</sub> HOLE TO BE  
ALIGNED WITHIN ±0.001  
OF HOLE ON OTHER SIDE  
OF CUFF  
2 PL



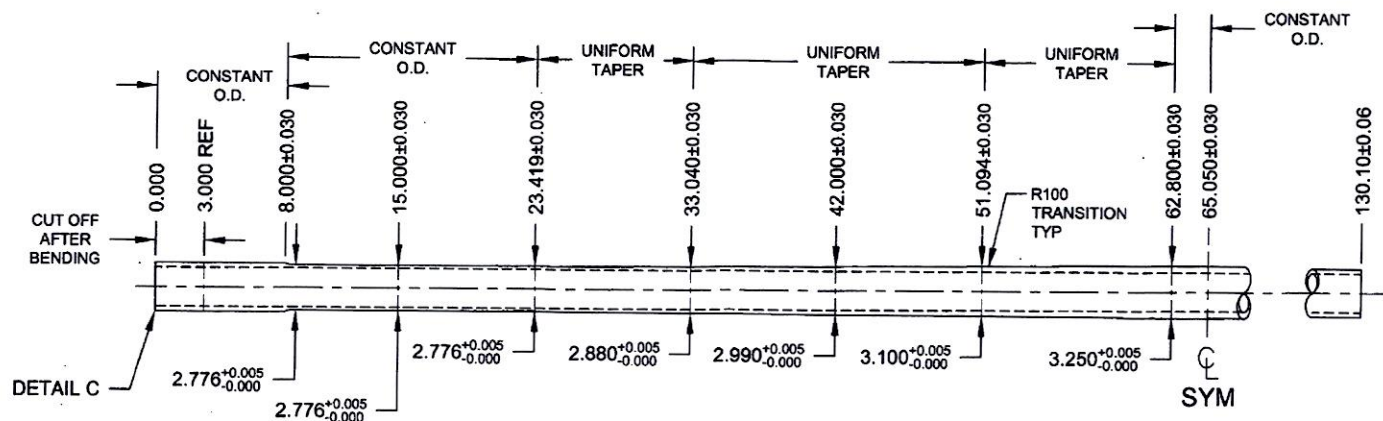
C1-3 **VIEW D-D: CUFF DETAIL**  
SCALE 4X

OK  
9/11/94  
**UNDER REVIEW**  
11/7/96

**UNDER REVIEW**  
15/14/20

**RELEASED**  
2014-05-26

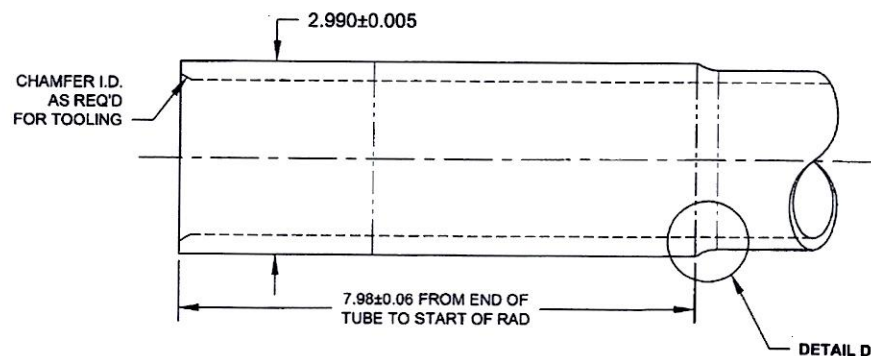
|            |          |                                                                                                                                                                                                                                                                                                      |              |
|------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | QP       | <b>DART AEROSPACE LTD</b>                                                                                                                                                                                                                                                                            |              |
| DRAWN      | QP       | HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                                                                          |              |
| CHECKED    | DW       | DRAWING NO.                                                                                                                                                                                                                                                                                          | REV. A       |
| MFG. APPR. | AS       | D412-664-443                                                                                                                                                                                                                                                                                         | SHEET 3 OF 4 |
| APPROVED   | AS       | TITLE                                                                                                                                                                                                                                                                                                | SCALE        |
| DE APPR.   | AS       | CROSSTUBE ASSY (412 HI AFT)                                                                                                                                                                                                                                                                          | NTS          |
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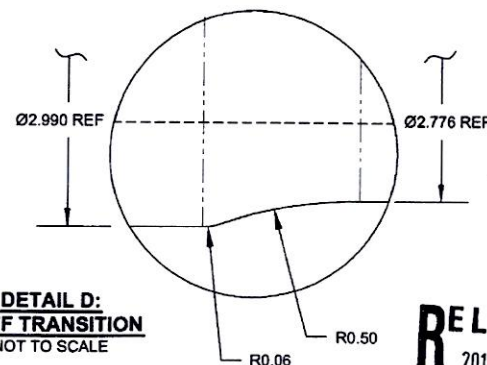
**D412-664-443TRN**  
**TURNING DETAIL**

**UNDER REVIEW**

UP 15/4/20



**DETAIL C:**  
**CUFF TRANSITION**  
SCALE 4X



OK 15/4/20  
**UNDER REVIEW**

**RELEASED**  
2014-05-26

|            |          |                                                                                                                                                                                                                                    |              |
|------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | DP       | <b>DART AEROSPACE LTD</b>                                                                                                                                                                                                          |              |
| DRAWN      | DP       | HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                        |              |
| CHECKED    | DP       | DRAWING NO.                                                                                                                                                                                                                        | REV. A       |
| MFG. APPR. | DP       | D412-664-443                                                                                                                                                                                                                       | SHEET 4 OF 4 |
| APPROVED   | DP       | TITLE                                                                                                                                                                                                                              | SCALE        |
| DE APPR.   | DP       | CROSSTUBE ASSEMBLY (412 HI AFT)                                                                                                                                                                                                    | NTS          |
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**D412-664-403 Stainless Steel Hardened Crosstube**

**setup**

3.25" rollers

Bend lines are @ 32", 35" from centerline of tube

1.75" shims are used in the buggy for side bends

**Middle Bend**

Middle bend goes from 35" line with crosstube being on the large table of the machine.

Approach for middle bend is 2870 on both rollers. Run programs middle auto, middle 6 check.

**Side Bends**

Run programs side 1-10 down the taper from 32" tangent line. Approach is 2900 on Y roller and 3385 on W roller. Programs 1-5 go back to the tangent line ready for next bend. Program 6-10 release at the end. Approaches on programs 6-10 are on the first line of programs... Programs 11-15 run down taper for 9" then come back up to finish tube slowly, be careful with these programs...

Enjoy

**Notes:**

13/12/12 ran 1 tube, program middle 6 was not enough, prog middle 7 overbent slightly. will create middle 6b to be a halfway point. after program 7 we ran the tube as per folio. one side finished nicely at program 10, the opposite side finished nicely after running program 1 2 times, then 13 to finish. this left the tube closer to max tolerance on the span, 53.730/53.800.

15/06/03 middle auto has been made but, due to the long program, only contains programs 1-5. program 6 must be run separately prior to checking tube on wall.

15/10/20 **NEW INSTRUCTIONS** Run program middle auto, 6, 7 CHECK. middles should be even and finished at this point. this has been consistent. sides run program 2, 4, 6, 7 check. program 8 should finish if it isn't already finished at 7. some tubes bent to the point of needing to lower the height after program 7. consider checking at 6 if middles happen to severely overbent

|                 |               |                 |
|-----------------|---------------|-----------------|
| <del>2</del>    | <del>MA</del> | <del>1</del>    |
| <del>4</del>    | <del>6</del>  | <del>4</del>    |
| <del>6</del>    | <del>7</del>  | <del>6</del>    |
| <del>7</del>    | (12)          | <del>7</del>    |
| (8)             |               |                 |
| <del>8</del>    |               | <del>8</del>    |
| <del>9</del>    |               | <del>9</del>    |
| <del>10x2</del> |               | <del>10x3</del> |
|                 |               | (9)             |





# skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

|                          |                              |               |                  |
|--------------------------|------------------------------|---------------|------------------|
| WO #: MWO28940           | Customer: Dart Aerospace Ltd | Dept: NDT YUL | Reference: 33169 |
| Descr:                   | PN:                          | S/N:          | Qty: 1           |
| Make:                    | Model:                       | Reg:          | A/C S/N:         |
| TSN:                     | CSN:                         | TSO:          |                  |
| Task: <b>UNSCHEDULED</b> |                              |               | Sequence: 1      |

Work Required:

CARRY OUT NDT INSPECTION (LIQUID PENETRANT) ON 8 CROSSTUBES

ITEM ID: D412-596-203 STAINLESS STEEL AFT CROSSTUBE - EXTENDED HIGHT 39 (QTY 2)

1 - WORK ORDER ID#: 148993

2 - WORK ORDER ID#: 148710

ITEM ID: D412-664-403 412 STAINLESS STEEL AFT CROSSTUBE - HIGH (QTY 1)

3 - WORK ORDER ID#: 139982

516/10/13

ITEM ID: D407-667-205 AFT CROSSTUBE - HIGH 407 (QTY 5)

4 - WORK ORDER ID#: 148760

5 - WORK ORDER ID#: 148773

6 - WORK ORDER ID#: 148759

7 - WORK ORDER ID#: 148761

8 - WORK ORDER ID#: 148758

| Action Taken:                                                                                 |          |     |     |       |         | Date:       | Initial/Stamp: |
|-----------------------------------------------------------------------------------------------|----------|-----|-----|-------|---------|-------------|----------------|
| LIQUID PENETRANT INSPECTION CARRIED OUT ON ITEMS LISTED ABOVE (ITEMS 1-8) AS PER ASTM1417M-13 |          |     |     |       |         | JUL 26 2016 |                |
| NO CRACK FOUND                                                                                |          |     |     |       |         |             |                |
| Pen: ZL-27A MWO5678 DEV: SKD-S2 MPO11715 CLEANER: SKC-S MPO13923 UV LIGHT M-20192             |          |     |     |       |         |             |                |
| Description                                                                                   | Location | P/N | Qty | Batch | S/N Off | S/N On      |                |
|                                                                                               |          |     |     |       |         |             |                |
|                                                                                               |          |     |     |       |         |             |                |
|                                                                                               |          |     |     |       |         |             |                |
|                                                                                               |          |     |     |       |         |             |                |
|                                                                                               |          |     |     |       |         |             |                |
|                                                                                               |          |     |     |       |         |             |                |

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

|            |  |               |             |
|------------|--|---------------|-------------|
| Signature: |  | ACA/SCA Stamp | Date:       |
| Name:      |  |               | JUL 26 2016 |



Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID **PO33169**

Purchase Order Date 7/26/2016

PO Print Date 7/26/2016

Page Number 1 of 4

**Order From :**

VC-SKY001

SKYSERVICE  
6120 MIDFIELD ROAD  
MISSISSAUGA, ONTARIO L5P 1B1  
CANADA

**Ship To :** DART AEROSPACE LTD  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

**Contact Name**

**Vendor Phone** 905-678-5636

**Ship To Contact**

**Ship To Phone**

**Ship Via:** Delivered

**Ship Acct:**

**Buyer**

**Customer POID**

**Customer Tax #** 10127-2607

**Terms** Net 30

**Currency** CAD

**FOB** FCA - (Free Carrier)

| Line Nbr           | Reference<br>Vendor Part Number<br>Line Comments<br>Delivery Comments                                                                                                                                                                                                                                                                        | Description/<br>Mfg ID        | Req Date/<br>Taxable<br>Promise Date | CD | Req Qty/<br>Unit of<br>Measure | PO Unit Price | Extended<br>Price |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------|----|--------------------------------|---------------|-------------------|
| 1                  | 71401-45                                                                                                                                                                                                                                                                                                                                     | Procurement Quality<br>Clause | 7/26/2016<br>No<br>7/26/2016         |    | 1.00                           | \$0.00        | \$0.00            |
|                    | Procurement Quality Clauses<br>A005 right of entry<br>A012 chemical and physical test report<br>A016 personnel qualification<br>A017 raw material identification (as applicable)<br>A026 certification of material conformance<br>A041 quality management system<br>A042 dart notification by supplier<br>A043 retention of quality document |                               |                                      |    |                                |               |                   |
| <b>Line Total:</b> |                                                                                                                                                                                                                                                                                                                                              |                               |                                      |    |                                |               | <b>\$0.00</b>     |
| 2                  | 148758                                                                                                                                                                                                                                                                                                                                       | D407-667-205                  | 7/26/2016<br>No<br>7/26/2016         |    | 1.00                           | \$125.00      | \$125.00          |
|                    | LIQUID PENETRANT INSPECTION AS PER QSI 038 OR<br>LPI AS PER ASTM 1417 LEVEL 2                                                                                                                                                                                                                                                                |                               |                                      |    |                                |               |                   |

**Note:**

7/26/2016



Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID **PO33169**

Purchase Order Date 7/26/2016

PO Print Date 7/26/2016

Page Number 2 of 4

**Order From :**

VC-SKY001

SKYSERVICE  
6120 MIDFIELD ROAD  
MISSISSAUGA, ONTARIO L5P 1B1  
CANADA

**Ship To :** DART AEROSPACE LTD  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

**Contact Name**

**Vendor Phone** 905-678-5636

**Ship To Contact**

**Ship To Phone**

**Ship Via:** Delivered

**Ship Acct:**

**Buyer**

**Customer POID**

**Customer Tax #** 10127-2607

**Terms** Net 30

**Currency** CAD

**FOB** FCA - (Free Carrier)

**Line Total: \$125.00**

|   |        |              |                              |      |          |          |
|---|--------|--------------|------------------------------|------|----------|----------|
| 3 | 148761 | D407-667-205 | 7/26/2016<br>No<br>7/26/2016 | 1.00 | \$125.00 | \$125.00 |
|---|--------|--------------|------------------------------|------|----------|----------|

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**Line Total: \$125.00**

|   |        |              |                              |      |          |          |
|---|--------|--------------|------------------------------|------|----------|----------|
| 4 | 148759 | D407-667-205 | 7/26/2016<br>No<br>7/26/2016 | 1.00 | \$125.00 | \$125.00 |
|---|--------|--------------|------------------------------|------|----------|----------|

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**Line Total: \$125.00**

|   |        |              |                              |      |          |          |
|---|--------|--------------|------------------------------|------|----------|----------|
| 5 | 148773 | D407-667-205 | 7/26/2016<br>No<br>7/26/2016 | 1.00 | \$125.00 | \$125.00 |
|---|--------|--------------|------------------------------|------|----------|----------|

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**Note:**

7/26/2016





Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID **PO33169**

Purchase Order Date 7/26/2016

PO Print Date 7/26/2016

Page Number 3 of 4

**Order From :**

VC-SKY001

SKYSERVICE  
6120 MIDFIELD ROAD  
MISSISSAUGA, ONTARIO L5P 1B1  
CANADA

**Ship To :** DART AEROSPACE LTD  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

**Contact Name**

**Vendor Phone** 905-678-5636

**Ship To Contact**

**Ship To Phone**

**Ship Via:** Delivered

**Ship Acct:**

**Buyer**

**Customer POID**

**Customer Tax #** 10127-2607

**Terms** Net 30

**Currency** CAD

**FOB** FCA - (Free Carrier)

**Line Total: \$125.00**

|   |        |              |                              |      |          |          |
|---|--------|--------------|------------------------------|------|----------|----------|
| 6 | 148760 | D407-667-205 | 7/26/2016<br>No<br>7/26/2016 | 1.00 | \$125.00 | \$125.00 |
|---|--------|--------------|------------------------------|------|----------|----------|

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**Line Total: \$125.00**

|   |        |              |                              |      |          |          |
|---|--------|--------------|------------------------------|------|----------|----------|
| 7 | 139982 | D412-664-403 | 7/26/2016<br>No<br>7/26/2016 | 1.00 | \$125.00 | \$125.00 |
|---|--------|--------------|------------------------------|------|----------|----------|

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**Line Total: \$125.00**

|   |        |              |                              |      |          |          |
|---|--------|--------------|------------------------------|------|----------|----------|
| 8 | 148710 | D412-596-203 | 7/26/2016<br>No<br>7/26/2016 | 1.00 | \$125.00 | \$125.00 |
|---|--------|--------------|------------------------------|------|----------|----------|

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**Note:**

7/26/2016



Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID **PO33169**

Purchase Order Date 7/26/2016

PO Print Date 7/26/2016

Page Number 4 of 4

**Order From :**

VC-SKY001

SKYSERVICE  
6120 MIDFIELD ROAD  
MISSISSAUGA, ONTARIO L5P 1B1  
CANADA

**Ship To :** DART AEROSPACE LTD  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

**Contact Name**

**Vendor Phone** 905-678-5636

**Ship To Contact**

**Ship To Phone**

**Ship Via:** Delivered

**Ship Acct:**

**Buyer**

**Customer POID**

**Customer Tax #** 10127-2607

**Terms** Net 30

**Currency** CAD

**FOB** FCA - (Free Carrier)

**Line Total:** \$125.00

|   |        |              |           |      |          |          |
|---|--------|--------------|-----------|------|----------|----------|
| 9 | 148993 | D412-596-203 | 7/26/2016 | 1.00 | \$125.00 | \$125.00 |
|   |        |              | No        |      |          |          |
|   |        |              | 7/26/2016 |      |          |          |

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**Line Total:** \$125.00

**PO Total:** \$1,000.00

**Note:** Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit [www.dartaerospace.com](http://www.dartaerospace.com) for further explanation.

**Change Nbr:** 3

**Change Date:** 7/26/2016